PATENT COOPERATION TREATY

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From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

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20. Okt. 2004
Frist bearb.: smt

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NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing *(day/month/year)*	19.10.2004
Applicant's or agent's file reference: H 2058 PCT	**IMPORTANT NOTIFICATION**

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP 03/06778	26.06.2003	27.06.2002

Applicant
TECHNOVISION GMBH GESELLSCHAFT FÜR ... et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international preliminary examining authority:

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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference H 2058 PCT	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/EP 03/06778	International filing date *(day/month/year)* 26.06.2003	Priority date *(day/month/year)* 27.06.2002
International Patent Classification (IPC) or both national classification and IPC A61F9/01		
Applicant TECHNOVISION GMBH GESELLSCHAFT FÜR ... et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
26.01.2004	19.10.2004
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Rick, K Telephone No. +49 89 2399-7246

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP 03/06778

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-10 as originally filed

Claims, Numbers

1-16 received on 06.10.2004 with letter of 06.10.2004

Drawings, Sheets

1/6-6/6 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

☐ the description, pages:

☒ the claims, Nos.: 17-36

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-16
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-16
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-16
	No:	Claims	

2. Citations and explanations

   see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. The document US-A-5 683 379 as cited by the applicant and considered to represent the most relevant state of the art, discloses an apparatus for laser vision correction, comprising means for controlling the apparatus to deliver a myopia correcting nominal laser ablation in an optical zone identified for myopia correcting nominal ablation of an exposed corneal surface of an eye and further to deliver a laser ablation in a region outside of the identified optical zone.

2. The subject-matter of claim 1 differs from US-A-5 683 379 in that said region outside of the identified optical zone is separated therefrom by a minimum distance.

3. The above feature solves the problem to create a central flattening of the corneal surface in said optical zone via a controlled biodynamic response and thereby to reduce the amount of laser ablation needed inside said optical zone for full myopia correction.
The same argumentation applies to US-A-6 302 877 of the international search report also disclosing an apparatus for laser vision correction to deliver laser ablation in a corneal region outside of an identified optical zone. Furthermore, in contrast to the device of the present invention, US-A-6 302 877 relates to the correction of presbiopia and accordingly a different optical zone ("not used for far distance viewing", see col. 12, l. 66 to col. 13, l. 5) is defined.
All further documents of the international search report are less relevant for the subject-matter of present claim 1. Accordingly the combination of features of claim 1 is neither known, nor rendered obvious by, the available prior art and meets the requirements of Article 33(2)-(4) PCT.

4. Claims 2-16 dependent thereon define further advantageous embodiments and as such also meet the requirements of Article 33 PCT.

Amended 1

October 6, 2004

PCT/EP03/06778
TechnoVision GmbH
Our Ref.: H 2058 PCT

Amended Claims

Support see "amended 2"

1. An apparatus for laser vision correction comprising means for controlling the apparatus to deliver a myopia correcting nominal laser ablation in an optical zone identified for the myopia correcting nominal ablation of an exposed corneal surface of an eye,
characterized in that:

the apparatus is further controlled to deliver a laser ablation in a region outside of the identified optical zone and separated therefrom by a minimum distance so as to create a central flattening of the corneal surface *via* a controlled biodynamic response to the exposed corneal surface outside of the identified optical zone.

2. The apparatus of claim 1, wherein the laser ablation in a region outside of the identified optical zone is at least part of an ablation ring.

3. The apparatus of claim 2, wherein the at least part of an ablation ring is either circular or acircular in shape.

4. The apparatus of claim 2, wherein the at least part of an ablation ring has an inner boundary adjacent an outer boundary of the identified optical zone.

5. The apparatus of claim 4, wherein the inner boundary of the at least part of the ablation ring begins at a distance, d, from the outer boundary of the identified optical zone, where $200\mu m \leq d \leq 600\mu m$.

6. The apparatus of claim 2, wherein the at least part of the ablation ring has a depth, t, where $10\mu m \leq t \leq 70\mu m$, and a width, w.

7. The apparatus of claim 6, wherein t and w are variable as a function of the biodynamic ablation location on the cornea.

8. The apparatus of claim 6, wherein w is a function of a laser beam diameter on the cornea.

9. The apparatus of claim 6, wherein w has a nominal value of about 1mm.

10. The apparatus of claim 1, wherein the laser ablation in a region outside of the identified optical zone lies within at least part of a transition zone of the nominal ablation.

11. The apparatus of claim 1, wherein the means for providing the controlled biodynamic response creates a tissue ablation volume for a desired refractive correction that is less than a corresponding tissue ablation volume for the desired refractive correction in the absence of the controlled biodynamic response.

12. The apparatus of claim 11, wherein the lessened tissue ablation volume has a smaller ablation depth over the optical zone than a corresponding ablation depth over the optical zone in the absence of the controlled biodynamic response.

13. The apparatus of claim 1, wherein the means for providing the controlled biodynamic response empirically determines the controlled biodynamic response from a statistically significant population.

14. The apparatus of claim 1, wherein the means for providing the controlled biodynamic response delivers a plurality of photoablative light pulses onto the corneal surface, all of which have only a 1mm diameter.

15. The apparatus of claim 14, wherein the plurality of photoablative light pulses have a direct aperture transmission portion and a diffractive aperture transmission portion so as to produce a soft-spot beam intensity profile.

16. The apparatus of any of claims 1 to 15, further characterized by:

a medium readable by the apparatus including an executable instruction for directing the apparatus to deliver the myopia correcting nominal ablation in the identified optical zone of the corneal surface, and further including an executable instruction for directing the apparatus to deliver a myopia correction enhancing biodynamic ablation in the corneal surface outside of the identified optical zone.